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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/743,644	03/05/2001	Hiroyuki Mizukami	112780-020	5738
24573	7590	04/19/2005	EXAMINER	
BELL, BOYD & LLOYD, LLC PO BOX 1135 CHICAGO, IL 60690-1135			ALEJANDRO MULERO, LUZ L	
			ART UNIT	PAPER NUMBER
			1763	

DATE MAILED: 04/19/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/743,644

Applicant(s)

MIZUKAMI ET AL.

Examiner

Luz L. Alejandro

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 8/3/04, 9/23/04, and 1/31/05.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-5 and 7-12 is/are pending in the application.
- 4a) Of the above claim(s) 2-4 and 9 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1, 5, 7-8, 10-12 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 September 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Drawings***

The proposed drawing correction and/or the proposed substitute sheets of drawings, filed on 9/23/04, has been disapproved because fig. 5 has neither been deleted in the marked-up drawings nor included in the replacement drawings. A proper drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The correction to the drawings will not be held in abeyance.

### ***Specification***

The disclosure is objected to because of the following informalities: the phrase "by providing the" at page 7-line 18 is repeated. At page 28-line 7 and page 30-line 20, the word – foregoing – has been misspelled. Also, everywhere in the specification, including in the Brief Description of the Drawings, the figures numbers, descriptions and reference numbers should be corrected according to the amendments made to the drawings, for example, "Fig. 6" should read -- Fig. 1 --, etc., and reference numbers that were used in the cancelled drawings need to be deleted from the specification, as long as they are not used to describe the instant pending drawings.

Appropriate correction is required.

A substitute specification excluding the claims is required pursuant to 37 CFR 1.125(a) because the amendments made in the specification (pre-amendment A and/or any amendment made to correct the informalities mentioned in this or previous office

actions) could lead to confusion and mistake during the issue and printing processes. Accordingly, the specification is required to be rewritten before passing the case to issue. See 37 CFR 1.125 and MPEP § 608.01(q).

A substitute specification filed under 37 CFR 1.125(a) must only contain subject matter from the original specification and any previously entered amendment under 37 CFR 1.121. If the substitute specification contains additional subject matter not of record, the substitute specification must be filed under 37 CFR 1.125(b) and must be accompanied by: 1) a statement that the substitute specification contains no new matter; and 2) a marked-up copy showing the amendments to be made via the substitute specification relative to the specification at the time the substitute specification is filed.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was

not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1, 5, 7 and 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Canon, JP 63-255373 in view of Satoshi, JP 10-284471, Ito et al., US 6,423,176, Ishii, US 5,529,657, Heinrich et al., US 5,527,394, or Deguchi, US 5,006,192.

Canon shows the invention substantially as claimed including a surface treatment apparatus for generating plasma by plasma generating electrodes 18 in a casing having said plasma generating electrodes, a raw gas inlet 11 and a substrate supporting table 10; the casing is partitioned into two chambers, a plasma generating chamber provided with the plasma generating electrodes and a substrate processing chamber provided with the substrate supporting table; the substrate processing chamber communicates with the plasma generating chamber through at least one plasma vent 20 having an orifice or nozzle shape; high frequency electric power source 2b is coupled to the plasma generating electrodes, wherein one of the plasma generating electrodes separates the plasma generating chamber from the substrate processing chamber and the plasma vent is formed at the one of the plasma generating electrodes (for a complete description of the apparatus see abstract and fig. 3 and its description).

Canon does not expressly disclose that the apparatus further comprises electrodes disposed in pair so as to be opposed to each other interposing a plasma flow spurted out from the plasma vent and provided in and between the vicinity of the plasma

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vent and the vicinity of the substrate supporting table. Satoshi discloses a processing apparatus comprising electrodes 1 disposed in pair so as to be opposed to each other interposing a plasma flow and provided in the vicinity of the substrate supporting table in order to prevent damage to the substrate by preventing adhesion of particles to the substrate by capturing floating particles with the electrodes (see, for example, the abstract and figures 1a and 1b, and their description). Also Ito et al., discloses a processing apparatus comprising electrodes 11/12/13 disposed in pair so as to be opposed to each other interposing a plasma flow and provided in the vicinity of the substrate supporting table in order to prevent damage to the substrate by removing electrically charged particles (see, for example, figures 11a, 12-13 and their descriptions). Additionally, Ishii discloses a processing apparatus comprising electrodes 110a and 110b disposed in pair so as to be opposed to each other interposing a plasma flow and provided in the vicinity of the substrate supporting table in order to control the plasma in the processing chamber to an optimum state (see, for example, figure 14 and its description). Furthermore, Heinrich et al., discloses a processing apparatus comprising electrodes K1 disposed in pair so as to be opposed to each other interposing a plasma flow and provided in the vicinity of the substrate supporting table in order to control the particle domination (ion to neutral) of the process performed in the apparatus (see, for example, figures 4 and 5a and their descriptions). Also, Deguchi discloses a processing apparatus comprising electrodes 7 disposed in pair so as to be opposed to each other interposing a plasma flow and provided in the vicinity of the substrate supporting table in order to limit/confine the plasma within the

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discharge space/regions surrounded by the electrode, and for preventing the plasma from coming into direct contact with the inner surfaces of the walls of the apparatus (see, for example, figures 1-3b and their descriptions). Therefore, in view of these disclosures, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the apparatus of Canon as to further comprise the claimed electrodes structure in order to: a) prevent damage to the substrate by preventing adhesion of particles to the substrate by capturing floating particles with the electrodes, b) prevent damage to the substrate by removing electrically charged particles, c) control the plasma in the processing chamber to an optimum state, d) control the particle domination (ion to neutral) of the process performed in the apparatus, and e) limit/confine the plasma within the discharge space/regions surrounded by the electrode, and for preventing the plasma from coming into direct contact with the inner surfaces of the walls of the apparatus. Note that the apparatus of Canon modified by Satoshi, Ito et al., Ishii, Heinrich et al., or Deguchi, will comprise electrodes disposed in pair so as to be opposed to each other interposing a plasma flow spurted out from the plasma vent and provided in and between the vicinity of the plasma vent and the vicinity of the substrate supporting table.

With respect to the shape of the plasma vent having a circular section (claim 10) or having a slit shape (claim 11), the configuration of the claimed plasma vent is a matter of choice which a person of ordinary skill in the art would have found obvious absent persuasive evidence that the particular configuration of the claimed container is significant (see *In re Dailey*, 357 F.2d 669, 149 USPQ 47 (CCPA 1966)).

Also, Canon does not expressly disclose applying electrical potential to the substrate. However, Satoshi, Ito et al., Ishii, Heinrich et al., and Deguchi, disclose coupling of electrical potential to the substrate in order to apply bias power (see the above mentioned figures and their descriptions, respectively). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the apparatus of Canon as to further apply electric potential to the substrate in order to apply bias power to the substrate. Furthermore, it should be noted, that it is common knowledge in the art that applying bias power to the substrate allows for the regulation/control of ions being directed to the substrate.

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Canon, JP 63-255373 in view of Satoshi, JP 10-284471, Ito et al., US 6,423,176, Ishii, US 5,529,657, Heinrich et al., US 5,527,394, or Deguchi, US 5,006,192, as applied to claims 1, 5, 7 and 10-12 above, and further in view of Collison et al., U.S. Patent 6,203,657.

Canon, Satoshi, Ito et al., Ishii, Heinrich et al., and Deguchi, are applied as above but do not expressly disclose that the raw gas-inlet defines an opening on a side face of the plasma vent. Collison et al. discloses a plasma apparatus in which a plasma generation chamber and a substrate processing chamber communicate with each other through a plasma vent 208, and wherein a side face of the plasma vent has an opening 222 defining a gas inlet through which gas is introduced (see fig. 3). Therefore, in view of this disclosure, it would have been obvious to one having ordinary skill in the art at



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the time the invention was made to modify the apparatus of Canon modified by Satoshi, Ito et al., Ishii, Heinrich et al., or Deguchi, as to comprise a gas inlet defining an opening on a side face of the plasma vent in order to inject additional gas(es) into the substrate processing chamber without having the additional gas(es) flow through the plasma generating chamber.

Claims 1, 5, 7 and 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zarowin et al., U.S. Patent 5,290,382 in view of Satoshi, JP 10-284471, Ito et al., US 6,423,176, Ishii, US 5,529,657, Heinrich et al., US 5,527,394, or Deguchi, US 5,006,192.

Zarowin et al. shows the invention substantially as claimed including a surface treatment apparatus for generating plasma by plasma generating electrodes 24 in a casing having said plasma generating electrodes, a raw gas inlet 14 and a substrate supporting table; the casing is partitioned into two chambers, a plasma generating chamber 12 provided with the plasma generating electrodes and a substrate processing chamber provided with the substrate supporting table; the substrate processing chamber communicates with the plasma generating chamber through at least one plasma vent 16 having an orifice or nozzle shape; high frequency electric power source 22 is coupled to the plasma generating electrodes, wherein one of the plasma generating electrodes separates the plasma generating chamber from the substrate processing chamber and the plasma vent is formed at the one of the plasma generating

electrodes (for a complete description of the apparatus see column 4-line 59 to page column 5-line 6, and fig. 2).

Zarowin et al. does not expressly disclose that the apparatus further comprises electrodes which are disposed so as to interpose a plasma flow spurted out from the plasma vent therebetween, and provided in and between the vicinity of the plasma vent and the vicinity of the substrate supporting table. Satoshi discloses a processing apparatus comprising electrodes 1 disposed in pair so as to be opposed to each other interposing a plasma flow and provided in the vicinity of the substrate supporting table in order to prevent damage to the substrate by preventing adhesion of particles to the substrate by capturing floating particles with the electrodes (see, for example, the abstract and figures 1a and 1b, and their description). Also, Ito et al. discloses a processing apparatus comprising electrodes 11/12/13 disposed in pair so as to be opposed to each other interposing a plasma flow and provided in the vicinity of the substrate supporting table in order to prevent damage to the substrate by removing electrically charged particles (see, for example, figures 11a, 12-13 and their descriptions). Additionally, Ishii discloses a processing apparatus comprising electrodes 110a and 110b disposed in pair so as to be opposed to each other interposing a plasma flow and provided in the vicinity of the substrate supporting table in order to control the plasma in the processing chamber to an optimum state (see, for example, figure 14 and its description). Furthermore, Heinrich et al., discloses a processing apparatus comprising electrodes KI disposed in pair so as to be opposed to each other interposing a plasma flow and provided in the vicinity of the substrate

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supporting table in order to control the particle domination (ion to neutral) of the process performed in the apparatus (see, for example, figures 4 and 5a and their descriptions).

Also, Deguchi discloses a processing apparatus comprising electrodes 7 disposed in pair so as to be opposed to each other interposing a plasma flow and provided in the vicinity of the substrate supporting table in order to limit/confine the plasma within the discharge space/regions surrounded by the electrode, and for preventing the plasma from coming into direct contact with the inner surfaces of the walls of the apparatus (see, for example, figures 1-3b and their descriptions). Therefore, in view of these disclosures, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the apparatus of Zarowin et al. as to further comprise the claimed electrodes structure in order to: a) prevent damage to the substrate by preventing adhesion of particles to the substrate by capturing floating particles with the electrodes, b) prevent damage to the substrate by removing electrically charged particles, c) control the plasma in the processing chamber to an optimum state, d) control the particle domination (ion to neutral) of the process performed in the apparatus, and e) limit/confine the plasma within the discharge space/regions surrounded by the electrode, and for preventing the plasma from coming into direct contact with the inner surfaces of the walls of the apparatus. Note that the apparatus of Zarowin et al. modified by Satoshi, Ito et al., Ishii, Heinrich et al., or Deguchi, will comprise electrodes disposed in pair so as to be opposed to each other interposing a plasma flow spurted out from the plasma vent and provided in and between the vicinity of the plasma vent and the vicinity of the substrate supporting table.

With respect to the shape of the plasma vent having a circular section (claim 10) or having a slit shape (claim 11), the configuration of the claimed plasma vent is a matter of choice which a person of ordinary skill in the art would have found obvious absent persuasive evidence that the particular configuration of the claimed container is significant (see *In re Dailey*, 357 F.2d 669, 149 USPQ 47 (CCPA 1966)).

Zarowin et al. does not expressly disclose applying electrical potential to the substrate. However, Satoshi, Ito et al., Ishii, Heinrich et al., and Deguchi, disclose coupling of electrical potential to the substrate in order to apply bias power (see the above mentioned figures and their descriptions, respectively). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the apparatus of Zarowin et al. as to further apply electric potential to the substrate in order to apply bias power to the substrate. Furthermore, it should be noted, that it is common knowledge in the art that applying bias power to the substrate allows for the regulation/control of ions being directed to the substrate.

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Zarowin et al., U.S. Patent 5,290,382 in view of Satoshi, JP 10-284471, Ito et al., US 6,423,176, Ishii, US 5,529,657, Heinrich et al., US 5,527,394, or Deguchi, US 5,006,192, as applied to claims 1, 5, 7 and 10-12 above, and further in view of Collison et al., U.S. Patent 6,203,657.

Zarowin et al., Canon, Satoshi, Ito et al., Ishii, Heinrich et al., and Deguchi are applied as above but do not expressly disclose that the raw gas-inlet defines an opening

on a side face of the plasma vent. Collison et al. discloses a plasma apparatus in which a plasma generation chamber and a substrate processing chamber communicate with each other through a plasma vent 208, and wherein a side face of the plasma vent has an opening 222 defining a gas inlet through which gas is introduced (see fig. 3).

Therefore, in view of this disclosure, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the apparatus of Zarowin et al. modified by Canon, Satoshi, Ito et al., Ishii, Heinrich et al., or Deguchi, as to comprise a gas inlet defining an opening on a side face of the plasma vent in order to inject additional gas(es) into the substrate processing chamber without having the additional gas(es) flow through the plasma generating chamber.

### ***Response to Arguments***

Applicant's arguments with respect to claims 1, 5, 7-8 and 10-12 have been considered but are moot in view of the new ground(s) of rejection.

### ***Conclusion***

An English machine translation of Satoshi, JP 10-284471, is hereby included.

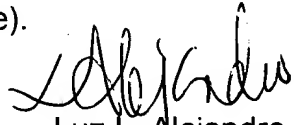
Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Luz L. Alejandro whose telephone number is 571-272-1430. The examiner can normally be reached on Monday to Thursday from 7:30 to 6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on 571-272-1435. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Luz L. Alejandro  
Primary Examiner  
Art Unit 1763

April 14, 2005